

## CLAIMS

What is claimed is:

1. A method of producing a silicided amorphous polysilicon to metal capacitor, said method comprising the steps of:
  - forming a first plate of the capacitor, said forming further comprising:
    - depositing a layer of polysilicon over an isolation layer, the isolation layer being formed on a substrate;
    - amorphizing the polysilicon layer; and
    - siliciding the exposed surface of the polysilicon layer;
  - depositing a dielectric over the first plate; and
  - forming a second plate of the capacitor over the dielectric layer.
2. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 1 wherein said amorphizing further comprises implanting a neutral species in the polysilicon layer.
3. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 2 wherein the neutral species is silicon.

4. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 2 wherein the neutral species is germanium.
5. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 2 wherein dosage of the neutral species resulting from said implanting is substantially between  $10^{15}$  per  $\text{cm}^2$  and  $10^{16}$  per  $\text{cm}^2$  to a depth of about 500 to 1000 Angstroms.
6. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 2 wherein the energy of the implant is about 100 KeV.
7. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 1 wherein the exposed surface of the amorphized polysilicon is substantially smooth relative to polycrystalline silicon.
8. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 1 wherein said amorphizing further comprises exposing the polycrystalline silicon to an ion bombardment produced in a plasma enhanced chemical vapor deposition (PECVD) chamber.
9. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 8 wherein the ion bombardment is generated from a heavy ion carrying gas, including argon, krypton, or xenon.

10. The method of producing a silicided amorphous polysilicon to metal capacitor as recited in Claim 1 wherein said amorphizing further comprises exposing the polycrystalline silicon to an ion bombardment produced in an etch chamber.
11. A silicided amorphous polysilicon to metal capacitor comprising:
  - a first plate comprising a top portion that is silicided amorphous polysilicon, the remaining portion of the first plate comprising polycrystalline silicon;
  - a second plate comprising a metal layer; and
  - a dielectric layer formed between the first and second plates.
12. The silicided amorphous polysilicon to metal capacitor as recited in Claim 11 wherein the top surface is substantially smoother relative to the remaining portion.
13. The silicided amorphous polysilicon to metal capacitor as recited in Claim 11 wherein the first plate is formed on an isolation layer.
14. The silicided amorphous polysilicon to metal capacitor as recited in Claim 11 wherein the amorphous silicon of the first plate is formed by implanting a neutral species into substantially into the top surface of a polycrystalline silicon layer.
15. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein the neutral species is silicon.

16. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein the neutral species is germanium.
17. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein dosage of the neutral species resulting from said implanting is substantially between  $10^{15}$  per  $\text{cm}^2$  and  $10^{16}$  per  $\text{cm}^2$ .
18. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein the neutral species is implanted with an energy of about 100 KeV.
19. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein the neutral species is implanted to depth of about 500 to 1000 angstroms.
20. The silicided amorphous polysilicon to metal capacitor as recited in Claim 14 wherein the top portion has a depth of about 500 to 1000 angstroms.
21. The silicided amorphous polysilicon to metal capacitor as recited in Claim 11 wherein the amorphous polysilicon of the first plate is formed by exposing a polycrystalline silicon layer to an ion bombardment produced in a plasma enhanced chemical vapor deposition (PECVD) chamber.
22. The silicided amorphous polysilicon to metal capacitor as recited in Claim 21 wherein the ion bombardment is generated from is amorphous polysilicon of the first plate is formed by exposing a polycrystalline silicon layer to an ion bombardment produced from a heavy ion carrying gas, including argon, krypton, or xenon.

22. The silicided amorphous polysilicon to metal capacitor as recited in Claim 12 wherein the amorphous polysilicon of the first plate is formed by exposing a polycrystalline silicon layer to an ion bombardment produced in an etch vapor deposition (PECVD) chamber.